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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/606,509

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John H. Brennan

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CORNING INCORPORATED

SP-TI-3-1

CORNING, NY 14831

EXAMINER

LYLES IRVING, CARMEN V

ART UNIT

PAPER NUMBER

1731

DATE MAILED: 11/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,509

Applicant(s)

BRENNAN ET AL.

Examiner

Carmen Lyles-Irving

Art Unit

1731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/27/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 8 is objected to because of the following informalities: claim 8 refers to itself in regards to the oil-based compound being a polyalpholefin. Claim 8 should refer to a --the method of claim 7--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially" in claims 1(d), 6, 9, and 16(a) is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Likewise, the term "sufficiently" in claims 1(e) and 16(b) and the term "effective" in claim 2 are relative terms which render these claims indefinite. Neither "sufficiently" nor "effective" are defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 2 recites the limitation "the inorganic raw materials." There is insufficient antecedent basis for this limitation in the claim.

Claim 3 recites the limitation "the cordierite raw materials" in regards to the "cordierite-forming materials" mentioned in claim 2. There is insufficient antecedent basis for this limitation in the claim.

In claims 13 and 14, "the plastic mixture" should be --the plasticized mixture--.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2, and 4-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beall et al (U.S. Patent No. 6,132,671) in view of Chalasani et al (U.S. Patent No. 6,080,345) and Gheorghiu (U.S. Patent No. 6,287,509) (hereinafter referred to as Gheorghiu '509).

Chalasani teaches the utilization of a powder mixture including powder materials, binder, solvent for the binder, surfactant, and a non-solvent (with respect to the binder, solvent and powder materials) in the formation of ceramic articles (column 2, lines 20-23). The binder that is preferred in the Chalasani teaching includes water, cellulose ether and hydrophobic non-solvents, all of

which are organics. The powder mixture is mixed, plasticized and shaped to form a green ceramic body (Beall, column 8, lines 17-42).

The binder used by Chalasani is difficult to be removed from the ceramic part without incurring distortion or breakage of the ceramic part (Beall, column 2, lines 32-34). However, Beall teaches the use of a binder system which results in a sufficiently high wet strength of the formed green body with at least a portion of the binder system capable of being removed by evaporation (a result of heating) during the drying process thereby reducing the propensity for cracks and other defects (column 2, lines 57 – 64). The Beall binder has 2 parts by weight of an odorless mineral spirit exhibiting a C9-C12 chain length (this binder is also organic) (column 12, lines 35, and 52-53). The formed ceramic body is further heated resulting in a fired ceramic article (column 3, lines 31-39).

Beall fails to teach heating the green ceramic body in an oxidizing atmosphere. However, Gheorghiu '509 teaches introducing into the furnace or kiln CO₂ during the first phase heating. CO₂ is introduced into the firing process resulting in a reduction of the temperature gradient between the green ceramic body skin and the core, thereby the ceramic body exhibits far less thermal deformation and cracking (column 3, lines 2-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the heating of the green ceramic body to evaporate or burn off the organic compounds (Beall) with the introduction of CO₂ during this heating process to produce a higher quality product with less cracks and other deformities (Gheorghiu '509).

Regarding claim 1(d), Beall fails to disclose the presently claimed property of a weight loss onset temperature for each of the organic compounds within the green ceramic body. But, it is considered that organic compounds would inherently possess a weight loss onset temperature. For example, inventive compositions 7 and 9 both incorporate two organic non-solvent components (Tables III and V). Because both inventive compositions 7 and 9 contain two different organic components, there would be two different weight loss temperatures at which the organics would burn off. Inherently, the organic with the lowest weight loss onset temperature would burn off or be removed prior to the organic with the higher weight loss onset temperature.

Regarding claim 2, Beall indicates that one of the preferred ceramic materials that is formed from inorganic raw materials upon firing is cordierite (column 7, lines 33-36).

Regarding claim 4, Beall teaches that acceptable non-solvents include light mineral oil, corn oil, a blend of light mineral oil and wax emulsion, a blend of paraffin wax in corn oil, and combinations of these (column 6, 31-36). Accordingly, it would be reasonable to combine oil, or an oil-based compound with a binder and a surfactant.

Regarding claims 5 and 6, in order for a compound, i.e. oil, to burn off, it is inherent that the compound has a weight loss onset temperature of a lower value than its flash point or LFL (lower flammability limit). Moreover, in order for the compound, i.e. the oil, to burn off, the temperature of the ceramic body must be kept below the flash point or LFL to keep the oil from igniting.

Regarding claims 7 and 8, Beall teaches that one of the preferred non-solvents is a polyalpholefin (column 6, lines 36-38). If the non-solvent or oil is a polyalphafin, then it is inherent by the nature of its characteristics that the oil's flash point is 155°C.

Regarding claims 9-12, Beall teaches that a preferred binder in ceramics is cellulose ether (column 6, line 56) particularly methylcellulose, methylcellulose derivative, and combinations thereof (column 6, lines 57-59). It is inherent that if the binder is a methylcellulose or a methylcellulose derivative it would have a weight loss onset temperature of 200°C. Because the weight loss onset temperature of the binder is greater than the flash point of the oil or oil based compound, the oil will burn off or be removed from the ceramic body before the binder.

Regarding claims 13 and 14, Beall teaches that the green ceramic body can be shaped by any known method for shaping plasticized mixtures. His preferred method is by extrusion through a die (column 8, lines 37-38, and 42) forming a honeycomb structure having thin walls and a large number of cells (column 3, lines 41-42).

Regarding claim 15, Gheorghiu '509 teaches that the CO₂ present in the firing atmosphere comprises at least 10% while the O₂ present in the atmosphere is less than about 10% (column 2, lines 65-67).

Regarding claim 16, it is rejected based upon the teachings of Beall and Gheorghiu '509 in claims 1 (in regards to further heating the green ceramic body to achieve a fired ceramic article), 4, 9, and 15.

Regarding claim 17, it is rejected based upon the teachings of Beall and Gheorghiu '509 as applied in claims 8 and 16.

Regarding claim 18, it is rejected based upon the teachings of Beall and Gheorghiu '509 as applied in claims 10 and 16.

Regarding claim 19, it is rejected based upon the teachings of Beall and Gheorghiu '509 as applied in claims 11 and 16.

Regarding claim 20, it is rejected based upon the teachings of Beall and Gheorghiu '509 as applied in claim 16. Additionally, Beall teaches for compositions primarily forming cordierite, firing of the body is conducted at temperatures ranging from 1300°C to 1450°C with holding times ranging from 1 to 8 hours (column 8, lines 54-57).

Regarding claim 21, it is rejected based upon the teachings of Beall and Gheorghiu '509 as applied in claims 2 and 16.

Claim 3 is rejected under 103(a) of 35 U.S.C. as being unpatentable over Beall in view of Chalasani and Gheorghiu '509 as applied to claims 1,2, and 4-21 above and further in view of Gheorghiu et al (U.S. Patent No. 6,027,684) (hereinafter referred to as Gheorghiu '684). Beall teaches making ceramics out of clay, talc and alumina powders. Beall fails to teach making ceramics from kaolin clays. However, Gheorghiu '684 teaches that the preferred batch materials for the production of cordierites are kaolin clays, talc and alumina. It would have been obvious to one of ordinary skill in the art at the time of the invention to use kaolin clays versus other types of clays because kaolin clays along with talc and alumina form cordierite ceramics that have improved thermal

shock resistance, strength and firing shrinkage (Gheroghiu '684, column 2, lines 27-30).

Claim 15 is also rejected under 103(a) of 35 U.S.C. as being unpatentable over Beall in view of Chalasani and Gheorghiu '509 as applied to claims 1,2, and 4-21 above and further in view of Dull et al (U.S. Patent No. 6,099,793). With respect to the green ceramic structural body being heated in an oxygen-rich atmosphere of up to 21% by volume O₂, Beall fails to teach heating the body in an O₂ atmosphere of greater than 10%. However, Dull teaches where in a first phase heating/firing of a green honeycomb structure a fluorine-free low-oxygen gas comprising less than about 20% O₂ by volume is introduced into the firing atmosphere (column 2, lines 57-59) to aid in carbonaceous material release. It would have been obvious to one of ordinary skill in the art at the time of the invention to increase the amount of oxygen by volume in the heating atmosphere of Beall in order to reduce the amount of detrimental effects in the ceramic body resulting from the carbonaceous material release.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carmen Lyles-Irving whose telephone number is (571) 272-2945. The examiner can normally be reached Monday through Friday from 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Griffin can be reached on 571-272-1189. The fax

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phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLI
11/09/04


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